

Serial No. 10/642,372

PATENT

## AMENDMENTS TO THE CLAIMS

1       1. (Original) A valve prosthesis for implantation with a vascular vessel,  
2       comprising:  
3            a support frame supporting one or more leaflets, wherein each of the  
4       one or more leaflets has a co-apting edge adjacent an end of the support  
5       frame;  
6            the support frame and leaflets together functional as a valve to  
7       restrict blood flow in a first direction when implanted in the vascular vessel;  
8       and  
9            a least one centering support element configured to contact a wall of  
10      the vessel at a position distal to the co-apting edge.

1       2. (Currently Amended) A valve prosthesis for implantation with a vascular  
2       vessel, comprising:  
3            a plurality of legs, each comprising a leaflet having an inner edge  
4       and an outer edge, and a support frame carrying the outer edge of the  
5       leaflet;  
6            wherein the plurality of legs are interconnected such that the support  
7       frame includes a serpentine configuration in which the outer edges of the  
8       leaflets exert radial force against the walls of vascular vessel and generally  
9       conform to the contours thereof;  
10      wherein the inner edges of the plurality of leaflets traverse the vessel  
11     lumen such that the plurality of leaflets are cooperable to define an opening  
12     therebetween to permit fluid flow in a first direction along the vascular  
13     vessel, while engaging each other sufficiently to restrict fluid flow in a  
14     second direction opposing the first direction; and  
15      wherein the valve prosthesis further comprises a second frame  
16     portion attached to least one the plurality of legs and extending at least one  
17     of distally and proximally therefrom.

- 2 -

EST AVAILABLE COPY

Serial No. 10/642,372 PATENT

1 3. (Original) A valve prosthesis for implantation with a vascular vessel,  
2 comprising:  
3 a serpentine-shaped frame having a first pair of bends and a second  
4 pair of bends, a first pair bends being oriented at a first end of the  
5 serpentine-shaped frame and located approximately 180° degrees with  
6 respect to one another, the second pair of bends being oriented at the  
7 second end of the serpentine-shaped frame and located approximately  
8 180° degrees with respect to one another and approximately 90° with  
9 respect to the first pair of bends, wherein the first pair of bends and a first  
10 bend of the second pair of bends comprise a first leg of the implantable  
11 valve, and the first pair of bends and a second bend of the second pair of  
12 bends comprise a second leg of the implantable valve, each of the first and  
13 second legs having a covering extending thereover, wherein the first and  
14 second legs define a opening therebetween that opens and closes in  
15 response to bidirectional fluid flow.

1 4. (Original) The valve prosthesis of claim 3, wherein the frame includes  
2 at least one open section therealong, the at least one open section  
3 including a circumferential member partially encircling the frame, thereby  
4 providing a bridge across the at least one open section.

1 5. (Original) The valve prosthesis of claim 3, wherein the frame  
2 includes at least one circumferential member attached to the adjacent pair  
3 bends of the first and second legs the frame such that the circumferential  
4 member is interposed between the legs and the walls of the vascular vessel  
5 to a least limit contact therebetween.

1 6. (Original) The valve prosthesis of claim 3, wherein the covering  
2 comprises a biomaterial.

Serial No.	10/642,372	PATENT
1	7. (Original) The valve prosthesis of claim 6, wherein the biomaterial	
2	includes an extracellular collagen matrix.	
1	8. (Original) A valve prosthesis for implantation within a vascular vessel,	
2	comprising:	
3	a support frame supporting two or more leaflets, the two or more	
4	leaflets including a co-aperture position;	
5	the support frame and leaflets together functional as a valve to	
6	restrict blood flow in a first direction when implanted in the vascular vessel;	
7	the support frame comprising frame elements to which the leaflets	
8	are attached, the frame elements non-circumferentially contacting the wall	
9	of the vascular vessel such that the frame elements are non-centering of the	
10	co-aperture position; and	
11	at least one centering support element configured to center the co-	
12	aperture position.	
1	9. (Original) The valve prosthesis, wherein the at least one centering	
2	support element extends laterally from the support frame such that it is	
3	interposed between at least one of the two or more leaflets and the walls	
4	of the vessel.	
1	10. (Original) A valve prosthesis for implantation within a vascular vessel,	
2	comprising:	
3	a support frame supporting one or more leaflets;	
4	the leaflets formed with a remodellable material configured for	
5	contact wall of the vascular vessel in a predetermined orientation;	
6	at least one centering support element for facilitating contact	
7	between the wall and the material in the predetermined orientation.	
1	11. (Original) A valve prosthesis for implantation within a vascular vessel,	
2	comprising:	

Serial No. 10/642,372

PATENT

3           a valve structure having a first end and a second end, a plurality of  
4   leaflets that include an outer edge and an inner edge, the plurality of inner  
5   edges defining an orifice therebetween for allowing the passage of fluid in  
6   a first direction, the plurality of leaflets configured to co-apt with one  
7   another to restrict the passage of fluid in a second, opposite direction;

8           a support frame that generally co-extends along the outer edges of  
9   the plurality of leaflets; and

10           a centering support structure comprising one or more centering  
11   elements extending from the valve structure that engage the walls of the  
12   vascular vessel in a manner to facilitate centering of the orifice within the  
13   lumen of the vascular vessel during deployment of the valve prosthesis.

1           12. (Original) The valve prosthesis of claim 11, wherein the one or more  
2   centering elements extend from at least one of the first end and the second  
3   end of the valve structure

1           13. (Original) The valve prosthesis of claim 11, wherein the one or more  
2   centering elements comprise a second frame portion attached to the first  
3   end of valve structure and extending longitudinally therefrom such that the  
4   second frame portion is deployed prior to the valve structure..

1           14. (Original) The valve prosthesis of claim 11, wherein the one or more  
2   centering elements comprise a second frame portion attached to the  
3   second end of valve structure and extending longitudinally therefrom such  
4   that the second frame portion is deployed after the valve structure.

1           15. (Original) The valve prosthesis of claim 11, wherein the one or more  
2   centering elements comprise a second frame portion attached to the first  
3   end of the valve structure and a third frame portion attached to the second  
4   end of the valve structure, both extending longitudinally from the valve  
5   structure.

Serial No.	10/642,372		PATENT
1	16. (Original) The valve prosthesis of claim 11, wherein the centering support structure includes centering support elements extending laterally from the support frame to contact the walls of the bodily passage, the lateral centering support elements being interposed between the plurality of leaflets and the walls of the vascular vessel.		
1	17. (Original) The valve prosthesis of claim 11, wherein the plurality of leaflets comprise a remodelable extracellular collagen matrix.		
1	18. (Original) The valve prosthesis of claim 11, wherein the plurality of leaflet consists of two leaflets.		
1	19. (Original) The valve prosthesis of claim 11, wherein the plurality of leaflet consists of three leaflets.		
1	20. (Original) A valve prosthesis for implantation within a vascular vessel, comprising:  a valve structure including a plurality of legs, one or more of the plurality of legs comprising a leaflet having an inner edge and an outer edge, and a support frame carrying outer edge, such that the outer edge directly contacts the wall of the bodily passage when deployed therein; and  a centering support structure comprising one or more centering elements attached to the legs of the valve structure, the one or more centering elements configured to contact the walls of the vessel at points extending at least one of proximal, distal, and lateral to the outer edge.		
1	21. (Original) The valve prosthesis of claim 20, wherein the centering elements span adjacent ones of the plurality of legs of the valve structure.		

Serial No.	10/642,372	PATENT
1	22. (Original) The valve prosthesis of claim 20, wherein the centering	
2	elements extend laterally from the plurality of legs of the valve structure.	
1	23. (Original) A valve prosthesis for implantation within a vascular vessel,	
2	comprising:	
3	a valve structure including a plurality of legs, one or more of the	
4	plurality of legs comprising a leaflet having an inner edge and an outer	
5	edge, and a support frame carrying the outer edge such that the outer edge	
6	directly contacts the wall of the vascular vessel when deployed therein;	
7	wherein the support frame comprises a plurality of interconnected	
8	serpentine rows each having at least eight bends and eight struts; and	
9	wherein the plurality of leaflets are attached to the support structure	
10	such that each spans at least two adjacent ones of the plurality of	
11	serpentine rows, and such that the at least eight struts of each of the at	
12	least two adjacent rows include both struts generally covered by a portion	
13	of the outer edge and struts that remain uncovered by the leaflet material,	
14	the uncovered struts comprise centering support elements configured to	
15	provide additional longitudinal support to the valve prosthesis.	
1	24. (Original) The valve prosthesis of claim 23, wherein:	
2	the plurality of interconnected serpentine rows comprise two	
3	adjacent rows defining a row of closed cells.	
1	25. (Original) The valve prosthesis of claim 23, wherein the plurality of	
2	leaflets span at least three serpentine rows of the support structure.	
1	26. (Original) The valve prosthesis of claim 23, wherein the plurality of	
2	interconnected serpentine rows are formed from a single nitinol tube.	
1	27. (Original) A valve prosthesis for implantation within a vascular vessel,	
2	comprising:	

Serial No. 10/642,372

PATENT

3           two or more leaflets having a resilient outer edge and an inner edge,  
4   the plurality of resilient outer edges collectively exerting radial force  
5   against the walls of the vascular vessel, the plurality of inner edges  
6   configured to define an orifice to allow passage of blood flowing toward the  
7   heart and coapt with one another to restrict blood flowing in a direction  
8   opposite thereto; and

9           a plurality of struts extending from at least one resilient outer edge  
10   to contact the walls of the vascular vessel to facilitate the centering of the  
11   orifice within the vascular vessel during deployment of the valve  
12   prosthesis.

1   28. (Original) The valve prosthesis of claim 27, wherein:

2           the two or more leaflets comprise a remodelable material.

1   29. (Original) A valve prosthesis for implantation within a vascular vessel,  
2   comprising:

3           one or more leaflets having a resilient outer edge adapted to exert  
4   force against the walls of the vascular vessel; and

5           one or more centering support elements that extend laterally from the  
6   one or more leaflets to contact the walls of the vessel to provide  
7   longitudinal centering support to the valve prosthesis.

1   30. (Original) A valve prosthesis for implantation within a vascular vessel,  
2   comprising:

3           a self-expanding support frame which in a relaxed condition has  
4   leaflet-supporting frame elements extending transverse to a longitudinal  
5   axis of the support frame;

6           the leaflet-supporting frame elements supporting one or more leaflets, the  
7   one or more leaflets also extending transverse to a longitudinal axis of the  
8   support frame in the relaxed condition and each presenting an outwardly-  
9   facing leaflet surface; and

Serial No. 10/642,372

PATENT

10                   the support frame also including at least one frame element  
11                   occurring outward of the outwardly-facing leaflet surface and longitudinally  
12                   co-extensive with at least a portion of the surface.

1           31. (Currently Amended) The valve prosthesis of claim ~~30~~, wherein the  
2           one or more leaflets comprise a remodelable material.

1           32. (Original) A valve prosthesis for implantation within a vascular vessel,  
2           comprising:

3                   a support frame having a first end and supporting one or more valve  
4                   leaflets;

5                   the support frame having a plurality of frame elements terminating  
6                   at said first end and configured to contact the wall of the vascular vessel at  
7                   a plurality of discrete positions thereby creating pivot points rendering the  
8                   support frame non-self-centering; and

9                   at least one centering support element attached to the support frame  
10                  for contacting the vessel wall at a position longitudinally spaced from the  
11                  pivot points and reducing pivotal freedom of the support frame about the  
12                  pivot points.

1           33. (Original) The valve prosthesis of claim 32, wherein the centering  
2           support elements are proximal to pivot points.

1           34. (Original) The valve prosthesis of claim 32, wherein the centering  
2           support elements are distal to pivot points.

1           35. (Original) The valve prosthesis of claim 32, wherein the centering  
2           support element are co-extensive with support frame.

1           36. (Original) A valve prosthesis for implantation within a vascular vessel,  
2           comprising:

Serial No. 10/642,372

PATENT

3           a support frame having a first end and supporting one or more valve  
4           leaflets; and  
5           at least one centering support element attached to the support frame,  
6           the centering support element comprising two elongate portions  
7           converging toward one another and connected through an adjoining  
8           portion adapted for contact with the vessel.

1       37. (Original) A valve prosthesis for implantation in a body vessel,  
2           comprising:

3           first and second self-expandable frames, the first self-expandable  
4           frame axially spaced from the second self-expandable frame;

5           a connecting strut connecting the first and second self-expandable  
6           frames; and

7           a valve leaflet attached to the first self-expandable frame and  
8           moveable between a first position that permits fluid flow through the body  
9           vessel in a first direction and a second position that substantially prevents  
10          fluid flow through the body vessel in a second, opposite direction.

1       38. (Currently Amended) The valve prosthesis of claim ~~37~~, wherein the  
2           valve leaflet is attached to the connecting strut.

1       39. (Original) The valve prosthesis of claim 37, wherein the second self-  
2           expandable frame contacts an inner wall of the body vessel when in an  
3           expanded configuration.

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- BLACK BORDERS**
- IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- FADED TEXT OR DRAWING**
- BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- SKEWED/SLANTED IMAGES**
- COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- GRAY SCALE DOCUMENTS**
- LINES OR MARKS ON ORIGINAL DOCUMENT**
- REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**